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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention]This invention relates to the train loading video information distribution display system which provides the passenger in a train guest room with video information.

[0002]

[Description of the Prior Art]Drawing 14 is a figure showing the outline composition of the conventional whole train loading video information distribution display system. Here, it is aimed at the train which comprises two or more vehicles (one numbered passenger car - n numbered passenger car). In a figure, 10 is the train information device carried in each of each vehicles, and processes train information. And it is connected in the transmission line 11, and the train information device 10 of each vehicles is linked mutually, and operates.

[0003]20 is the video information distribution system carried in the head vehicle, it is connected with the train information device 10A of the vehicles, and it inputs train information, for example, train position information, makes this a trigger, and outputs required video information. The video information which drawing 15 is a figure showing the internal configuration of the video information distribution system 20, and was inputted via the train information device 10 or the radio-transmission-and-reception device 50 mentioned later, Digital image processing of the video information memorized in the storage parts store via a storage like [this / radio-transmission-and-reception device 50 or exterior] CD-ROM is carried out, and also signal abnormal conditions are carried out and it is outputted to the high frequency region after analogue conversion.

[0004]The transmission line where it returns to drawing 14 and 30 transmits the output (video-delivery-through-the-Internet output) of the video information distribution system 20 to each vehicles, and 31 are reception displays which a diverging device and 32 receive a terminating set, 33 receives an amplifying device, and 40 receives the video information G from the video

information distribution system 20 (an arrow shows among a figure), and are displayed.

[0005]The modulating signal which drawing 16 is a figure showing the internal configuration of the reception display 40, and was transmitted from the video information distribution system 20, After getting over within the reception display 40, digital conversion is carried out, image processing and display control, such as overwrite of full-screen display conversion or text and insertion of a telop, are made, and it is displayed with a display panel after that. It returns to drawing 14, and it is the radio-transmission-and-reception device connected to the video information distribution system 20, and 50 inputs usual video information and also real time information, an emergency message, etc. on radio from the ground station 51, and outputs them to the video information distribution system 20.

[0006]Next, operation is explained. The video information distribution system 20 inputs required train information, for example, diagram delay information etc., from the train information device 10, and processing treatment is carried out to video information, and it outputs them to it. Real time information, such as news, is inputted from the radio-transmission-and-reception device 50, it saves at an internal storage parts store, and the video information of the real time concerned is once outputted by interruption using the train information, for example, the train position information, from the train information device 10. The video information G outputted from the video information distribution system 20 is received by the reception display 40 of each vehicles through the transmission line 30, the diverging device 31, and the amplifying device 33, required image processing is performed, it is displayed on the display panel, and the passenger in vehicles is provided with the video information.

[0007]

[Problem(s) to be Solved by the Invention]By the way, the same NTSC system as the distribution system of the usual TV signal is used for the distribution system of the video information data in the above conventional train loading video information distribution display systems, and it serves as specification which is a frame image screen of 30 sheets and transmits the video information of an animation and a still picture in 1 second. And although, especially as for this moving image information, that signal-transmission capacity becomes very large, when performing this by analog-data transmission, the resolution of one frame (image screen) turns into about 320 vertical definition 480x horizontal resolution from restriction of that transmission capacity. This resolution serves as a low value as compared with usual XGA (resolution: 1024x768), SVGA (resolution: 800x600), etc. in a personal computer monitor. But although transmission of the high resolution animation video information by a digital data method is also technically possible, especially, the mechanism of the abnormal conditions and a recovery cannot but become complicated, and it must be said at a present stage that it is inferior to practicality by a train loading video information distribution

display system from a high cost.

[0008]As mentioned above, in the conventional system, when displaying an animation, in order to indicate the frame of the above-mentioned resolution (about 480x320) by high-speed with the speed of 30 sheets in 1 second, the lowness of the image quality by this low resolution is not recognized by human being's eyes like the usual television televising. So to speak, human being's eyes are deceived. However, when a still picture is displayed in the above-mentioned resolution (about 480x320). When the lowness of the image quality by this low resolution had been recognized by human being's eyes and still picture information with many characters was especially displayed on them with small fonts, such as magazine advertising, the character was crushed, and it did not become a clear display, but there was a problem that it could not be used as a good advertising display.

[0009]In the conventional train loading video information distribution display system, it had to be said that all the video information that distributes the video information outputted from the video information distribution system 20 as it is, and is displayed since it is only displaying on the reception display 40 was the same contents, and was insufficient in respect of fullness-izing of a display function.

[0010]There is no condition-monitoring function whether the reception display 40 installed is functioning on one train normally, and reliability of operation had anxiety. [many (about 40-100 sets)]

[0011]An object of this invention is to obtain the train loading video information distribution display system [avoiding / were made in order to cancel the above problems, and / a high cost] which can provide a passenger with high definition still picture information with moving image information. It aims at obtaining the train loading video information distribution display system whose presenting of video information which is different for every reception display to two or more reception displays is attained. It aims at obtaining the train loading video information distribution display system whose surveillance for every reception display carried in each vehicles is attained.

[0012]

[Means for Solving the Problem]A train loading video information distribution display system concerning claim 1 of this invention, A train information means for it to be carried in each of two or more vehicles which constitute one train, to link mutually, and to process train information, A video information distribution means which carries out the distribution output of the video information which is connected with either of these train information means, and consists of animation video information and still picture information, And while being carried in each of each above-mentioned vehicles and connected in the above-mentioned train information means and the 1st transmission line of the vehicles concerned, it is connected in the above-mentioned video information distribution means and the 2nd transmission line, Have

a video information receiving displaying means which displays received video information, and the above-mentioned animation video information is distributed to the above-mentioned video information receiving displaying means in a course of the 2nd transmission line of the above from the above-mentioned video information distribution means, The above-mentioned still picture information is distributed to the above-mentioned video information receiving displaying means in a course of the 1st transmission line of the above through the above-mentioned train information means from the above-mentioned video information distribution means.

[0013]A train loading video information distribution display system concerning claim 2, In composition of that each of that train information means links mutually via a digital transmission line, animation video information distributes still picture information to a video information receiving displaying means from a video information distribution means with a digital data signal according to an analog data signal, respectively.

[0014]A video information receiving displaying means of a train loading video information distribution display system concerning claim 3, It has two or more displays which display video information, and a display control which consists of a control section which reads predetermined video information from a storage parts store which memorizes video information received from a video information distribution means, and this storage parts store, and is outputted to the above-mentioned predetermined display.

[0015]A train loading video information distribution display system concerning claim 4, It is provided in a tee of each vehicles in the 2nd transmission line, and has a branching distribution system which consists of a control section which reads predetermined video information from a storage parts store which memorizes video information received from a video information distribution means, and this storage parts store, and is outputted to a predetermined video information receiving displaying means and an adjacent vehicle of the vehicles concerned.

[0016]A video information distribution means of a train loading video information distribution display system concerning claim 5 is superimposed on a video information signal, outputs a control signal, and controls the control section according to claim 3 or 4 by the control signal concerned.

[0017]A train loading video information distribution display system concerning claim 6 is provided with a monitor means which supervises existence of an operation abnormality with polling/selecting between video information receiving displaying means connected to a train information means and this train information means in each vehicles.

[0018]

[Embodiment of the Invention]Embodiment 1. drawing 1 is a figure showing the outline composition of the whole train loading video information distribution display system in this embodiment of the invention 1. In a figure, 60 is the train information device carried in each of each vehicles (here one numbered passenger car - n numbered passenger car), and

processes train information which shows the distance expressed in kilometers from train operation information, such as car stop information and the arrival time, a starting station, etc., such as instrument mounting information, including train position information, a door opening and closing command, etc. And it is mutually connected via the digital transmission line 11, and the train information device 60 of each other which the train information device 60A of the lead coach was connected with various control operation devices, such as a master controller (mass media), and was carried in each vehicles is linked, and performs radial transfer of the various above-mentioned train information.

[0019]Drawing 2 shows the internal configuration of the train information device 60 carried in intermediate rolling stock, and is connected with the train information device 60 carried in the adjacent vehicle via communication I/F in the digital transmission line 11. In the invention in this application, still picture information is transmitted using the transmission line of this train information device 60. As instrument mounting, a door, an air-conditioner, a brake, ATO, an automatic broadcast device, SIV, a motor, etc. correspond, and each train information device has the function to transmit these equipment state data (digital data) (packet transmission), and the function to perform a control action required based on those condition data. In the reception display 80 (it mentions later for details), it is connected in the 1st transmission line 35, and the highly precise still picture information outputted from the video information distribution system 70 mentioned later is transmitted.

[0020]It returns to drawing 1, and it is the video information distribution system carried in the head vehicle, and 70 outputs still picture information while it is connected with the train information device 60A of the vehicles and it inputs train information. This still picture information is outputted by a digital data signal, and is transmitted to the reception display 80 carried in each vehicles in the course of the transmission line 35 through the train information device 60 carried in each vehicles. The video information distribution system 70 is connected to the reception display 80 carried in each vehicles via the 2nd transmission line that consists of the transmission line 30 which kept being lengthened between vehicles, the diverging device 31 formed in each vehicles, the amplifying device 33 inserted in every place of the transmission line 30, the terminating set 32, and the transmission line 36, Moving image information is transmitted with an analog data signal in the course of this 2nd transmission line.

[0021]50 is the radio-transmission-and-reception device connected to the video information distribution system 70, from the ground station 51, inputs the contents data of what is called real time information, such as news and a weather report, the message in an emergency, etc. on radio, and outputs it to the video information distribution system 70.

[0022]Drawing 3 shows the internal configuration of the video information distribution system 70, and first, in the radio-transmission-and-reception device 50, it transmits failure information

(it mentions later) etc. to the radio-transmission-and-reception device 50 while it is connected via communication I/F in a digital transmission line and it receives various kinds of contents data from the radio-transmission-and-reception device 50. While being connected with the train information device 60A of a lead coach in a digital transmission line and receiving train information, such as distance expressed in kilometers and station information, and also the failure information mentioned later from the train information device 60A, still picture information, display commands (control signal), etc. are transmitted to the train information device 60A.

[0023] Control required of CPU (control section) should do video information once memorized to the storage parts store. Still picture information is distributed to a reception display via the train information device mentioned above, and digital image processing of the moving image information is carried out by an image processing portion, and also signal transformation is carried out to a high frequency region by a signal modulation part after analogue conversion, and it distributes to a reception display via the 2nd transmission line (30, 31, 36 grades).

[0024] The moving image information Ga by the analog data signal by which drawing 4 shows the internal configuration of the reception display 80 carried in each car, and high frequency analog modulation was carried out in the video information distribution system 70, The still picture information Gb by the digital data signal which it was digitized after the recovery by the signal demodulation section, and has been transmitted from the train information device 60, After communication I/F passage, image processing, such as change of screen size and overwrite of text, and display processing are performed by the image processing portion and a display control part, and it is displayed on a display panel.

[0025] As mentioned above, in this embodiment of the invention 1, the still picture information with small data volume is transmitted using the digital transmission line of a train information device as compared with moving image information. One still picture information becomes a 100 - 200K transmission byte grade by carrying out the data compression also of high-resolution XGA (1024x768), High-definition still picture information can be distributed by using the transmission system (packet system) adopted from the former for link between train information devices of this, without exerting trouble on the original function of a train information device. When applying the invention in this application by established vehicles, in an established train information device, it is only sufficient to make additional correction of some of the control and transmission software programs, and it can realize by reconstruction of low cost.

[0026] Of course, in order to display the still picture of the above-mentioned high resolution, it is necessary to also make into the thing of the high resolution specification the display for indication adopted with a reception display. But in the case of the method which transmits the conventional still picture and an animation with the same analog data, even if it changes a

display for indication into the thing of high resolution specification, the image quality of a still picture will not improve.

[0027]On the other hand, data volume of moving image information is large, and, in the case of contents for about 500 K bytes, and general commercial 15 seconds, it serves as capacity of about 7.5 M bytes from the contents which are about 1 second. However, since it looks clear enough also with the standard resolution (480x320) of NTSC system in the case of an animation as mentioned already, Without changing this to the high resolution digital transmission system which becomes daringly very expensive, the analog transmission method from the former can be followed and a train loading video information distribution display system with cost performance good as a whole can be realized.

[0028]Since the method which transmits moving image information and still picture information to a reception display in another course is adopted in the system of this application, Even if abnormalities occur in one of the transmission lines, continuation of presenting of the video information by the animation or still picture which uses a normal transmission line is possible, and the reliability of the part and a display function improves.

[0029]Further, it can have two or more displays for indication in the same vehicles and the video information of contents which are different in these each display for indication, respectively can also be displayed to display the video information of different contents for every vehicles about the display information of the reception display 80. Namely, the control signal which specifies the address which identifies on which display for indication of what No. vehicle it displays as the video information signal outputted from the video information distribution system 70 is made to superimpose, In the train information device 60 and the reception display 80 of each vehicles, the video information displayed with the display for indication which distinguishes this address and a self-device has jurisdiction over is extracted, and video information is sent out to the display for indication of the specified address. moreover -- also memorizing the video information which should be displayed on the display for indication of the other car to the storage parts store of the train information device of self-vehicles -- being concerned -- others -- reading required video information from the above-mentioned storage parts store, when the train information device of vehicles breaks down -- being concerned -- others -- by sending out to vehicles. The backup function at the time of failure can also be given.

[0030]Between the reception displays 80 connected to the train information device 60 carried in the same vehicles, and this train information device 60 as shown in drawing 5, And the monitor means which supervises the existence of an operation abnormality with polling/selecting between the train information device 60A and the video information distribution system 70 is established. Namely, the "question" and the "response" are mutually repeated among both devices with the constant period T1 (generally about 100 to 1000 ms),

For example, by deciding that it judges with the partner having broken down from twice as many time as the cycle T1 and a partner when there was no response, The existence of the operation abnormality of all the reception displays 80 carried in each vehicles and video information distribution systems 70 can be supervised, and the reliability of the display function of this system improves.

[0031]Embodiment 2. drawing 6 is a figure showing the outline composition of the whole train loading video information distribution display system in this embodiment of the invention 2. Hereafter, it explains focusing on a different point from Embodiment 1. That is, the diverging device 31 of Embodiment 1 was replaced in the 2nd transmission line that transmits moving image information, and the distribution system 71 is formed in this Embodiment 2.

[0032]Drawing 7 shows the internal configuration of this distribution system 71, and after digital conversion of the video information from the distribution system of an adjacent vehicle is restored to it and carried out by a signal demodulation section, it is once memorized by the storage parts store. And based on the control signal with which a control section (CPU) is outputted to the video information signal by superimposing from the video information distribution system 70, The video information outputted to the reception display 80 of self vehicles is read, and after adding and carrying out analogue conversion of the required image processing, high-frequency abnormal conditions are carried out and it sends out to each reception display 80. Separately, CPU reads the video information sent to the vehicles after the following vehicles from a storage parts store, and sends it out towards the distribution system 71 of the upper adjacent vehicle of analogue conversion and high-frequency abnormal conditions.

[0033]The diverging device 31 in the previous gestalt 1 has only the function which carries out branch transmittance of the video information from the video information distribution system 70 as it is to the reception display 80 of the vehicles concerned, and the diverging device 31 of an adjacent vehicle. Therefore, the high-frequency abnormal conditions of the video information outputted from the video information distribution system 70 should be carried out at two or more channels to display contents which are different in each reception display 80. As a result, even if it is a system which comprises long organization with many displays for indication, the classification of contents is restrained by the number of the above-mentioned channels, and cannot not necessarily display contents which are different in each display for indication.

[0034]On the other hand, since it had the control section which once memorizes video information to a storage parts store, reads predetermined video information in the distribution system 71 in this Embodiment 2, and is outputted to the predetermined reception display 80, By setting up suitably the transmission-time belt from the video information distribution system 70 to the distribution system 71, the video information of the classification of a large number from which contents differ can be sent into each distribution system 71, and contents which are

different in each of many reception displays 80 can be displayed.

[0035]Although high-frequency (RF) abnormal conditions are carried out and transmission of the moving image information between each distribution system 71 is performed in drawing 7, when the distance between adjacent vehicles is short and there is little influence of a disturbance noise, composition of this transmission can be made [simpler] cheap by making RF modulation into non-*. By giving the amplifying function of a video information signal to each distribution system 71, the amplifying device 33 which was required of the gestalt 1 can be omitted, and there is also an advantage by which a system configuration is simplified.

[0036]Embodiment 3. drawing 8 is a figure showing the outline composition of the whole train loading video information distribution display system in this embodiment of the invention 3. Hereafter, it explains focusing on a different point from Embodiment 1. That is, in Embodiment 1, the reception display 80 carried in each vehicles consists of the display controls 81 and the displays 82 which are mentioned later in this Embodiment 3.

[0037]Drawing 9 shows the internal configuration of the above-mentioned display control 81, it gets over and the moving image information Ga received via the 2nd transmission line from the video information distribution system 70 is once memorized by the storage parts store after digital conversion. After the still picture information Gb from the train information device 60 passes through communication I/F, it is once memorized by the storage parts store. And the control signal outputted to the video information signal by superimposing from the video information distribution system 70 is separately received by train information device 60 course, Based on this control signal, predetermined video information is read from a storage parts store, and required image processing is performed, and also parallel processing is performed for superposition of the display contents for every display 82, and telop sentence character information by a display control part, and the display output of contents which are different in two or more displays 82 is performed. Drawing 10 shows the internal configuration of one set of the display 82, changes the indicative data from the display control 81 into digital one, and displays it on a display panel.

[0038]As mentioned above, in this Embodiment 3, It has the display control 81 provided with the storage parts store which once memorizes the received video information (an animation and a still picture), and the control section which reads predetermined video information from this storage parts store, and is outputted to the predetermined display 82, Since it had composition which displays required video information on each display 82 with this output, When providing many displays especially in one vehicles, while the composition of this display system becomes simply cheap, the video information of the classification of a large number from which contents differ can be displayed with each display 82 by setting up suitably the time zone which receives video information with the display control 81.

[0039]Since the monitoring function explained by Embodiment 1 can be concentrated and

processed with the display control 81, it also has an advantage it becomes simple required constituting.

[0040]Furthermore the above-mentioned display control 81 and the display 82 were used for drawing 11, it is a concrete example of application and it shows the equipment-layout composition in 1 vehicles. Figures are the vehicles of a four one side door, and are installing two sets each of display 821Ra, 821Rb, ..., 824Ra, 824Rb, 821La, 821Lb, ..., 824La, and 824Lb in each door upper part. And for example, the two above-mentioned sets each of one side use the commercial display aimed at obtaining advertising revenue, and another side is made a train guidance display, such as destination guidance and change guidance.

[0041]As four display controls are installed 811-814 times and it is shown in a figure, the display control 811 sends out an indicative data to four sets of display 821Ra -, and 824Ra, and a telecommunication cable with parallel four is used in the outgoing end. And the train information device 60 of the vehicles concerned performs transmission of still-picture-information Gb, other control signals, and failure information among four sets of the display controls 811-814, and a telecommunication cable with parallel four is used in the outgoing end. From the diverging device 31 of the vehicles concerned, the moving image information Ga is sent out to four sets of the display controls 811-814, and a telecommunication cable with parallel four is used in the outgoing end.

[0042]And by the control facility of each display controls 811-814, when it seems that it became impossible for the display for the inner commercial display of two sets each of the displays of the door upper part to display by an operation abnormality, priority can be given to a commercial display and it can indicate to the display of another side by commercial, for example. The telop of the text in an emergency can also be made to superimpose on a display screen also in this case.

[0043]The installation composition of the telecommunication cable when not adopting a display control by the vehicles which install the display of drawing 11 and the same number is shown in drawing 12. In this case, in the outgoing end of the train information device 60 and the diverging device 31, a telecommunication cable with respectively parallel 16 will be used, and the composition of cable installation becomes complicated as compared with the case of drawing 11. On the contrary, it becomes simple by forming a display control constituting in the case of drawing 11 of this Embodiment 3.

[0044]Embodiment 4. drawing 13 is a figure showing the outline composition of the whole train loading video information distribution display system in this embodiment of the invention 4. This Embodiment 4 is what replaced the diverging device 31 in previous Embodiment 3, and installed the distribution system 71 of Embodiment 2, and there is an advantage to which especially the distribution function of moving image information is substantial as the isomorphous voice 2 explained.

[0045]In explanation of each above embodiment, although the analog transmission of the moving image information shall be carried out, if the cost of mass digital transmission will reduce it in the future, this invention is applicable also as a method which transmits this digitally. In this case, the transmission route of the train information device which exists transmission of the still picture information with which there is little transmission capacity and it can be managed in a train from the first is utilized, and the transmission route of moving image information is carrying out by the independent route, Specifications of the still picture information and moving image information to transmit, such as resolution, can be set as original contents, without being restrained mutually, and the display system of the video information which consists of an animation and a still picture can be realized more economically rationally.

[0046]

[Effect of the Invention]As mentioned above, the train loading video information distribution display system concerning claim 1 of this invention, A train information means for it to be carried in each of two or more vehicles which constitute one train, to link mutually, and to process train information, The video information distribution means which carries out the distribution output of the video information which is connected with either of these train information means, and consists of animation video information and still picture information, And while being carried in each of each above-mentioned vehicles and connected in the above-mentioned train information means and the 1st transmission line of the vehicles concerned, it is connected in the above-mentioned video information distribution means and the 2nd transmission line, Have a video information receiving displaying means which displays the received video information, and the above-mentioned animation video information is distributed to the above-mentioned video information receiving displaying means in the course of the 2nd transmission line of the above from the above-mentioned video information distribution means, Since the above-mentioned still picture information was distributed to the above-mentioned video information receiving displaying means in the course of the 1st transmission line of the above through the above-mentioned train information means from the above-mentioned video information distribution means, By transmitting animation video information and still picture information by the route which carried out mutually-independent, without newly providing the transmission route which keeps lengthening each vehicles by utilizing effectively the transmission route which comprises each train information means. It becomes possible to set each of an animation and still picture information as the optimal transmission condition, and to distribute it.

[0047]The train loading video information distribution display system concerning claim 2, In composition of that each of that train information means links mutually via a digital transmission line, animation video information with an analog data signal. With a digital data

signal, since still picture information was distributed to the video information receiving displaying means from the video information distribution means, respectively, it can realize the display with good animation video information and still picture information on high resolution, without becoming a high cost.

[0048]The video information receiving displaying means of the train loading video information distribution display system concerning claim 3, Since it had two or more displays which display video information, and a display control which consists of a control section which reads predetermined video information from the storage parts store which memorizes the video information received from the video information distribution means, and this storage parts store, and is outputted to the above-mentioned predetermined display, It becomes possible to display video information different, respectively on two or more displays, and it becomes simple constituting it of the connection between apparatus in that case.

[0049]The train loading video information distribution display system concerning claim 4, It is provided in the tee of each vehicles in the 2nd transmission line, Since it had the branching distribution system which consists of a control section which reads predetermined video information from the storage parts store which memorizes the video information received from the video information distribution means, and this storage parts store, and is outputted to the predetermined video information receiving displaying means and adjacent vehicle of the vehicles concerned, It becomes possible to display animation video information different, respectively on two or more video information receiving displaying means especially.

[0050]The video information distribution means of the train loading video information distribution display system concerning claim 5, It superimposes on a video information signal and a control signal is outputted, and since the control section according to claim 3 or 4 was controlled by the control signal concerned, it enables it to ensure control of the video information displayed on each displaying means from a video information distribution means.

[0051]The train loading video information distribution display system concerning claim 6, Since it had the monitor means which supervises the existence of an operation abnormality with polling/selecting in each vehicles between the video information receiving displaying means connected to a train information means and this train information means, By using a train information means, the performance monitor of the video information receiving displaying means of each vehicles becomes possible, and the reliability as a display system improves.

[Translation done.]